

# East text search

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	7397	((705/7) or (705/8) or (705/9) or (705/28) or (705/26)).CCLS.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2005/03/04 12:12
L2	580	1 and "supply chain"	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/03/04 12:05
L3	516	2 not (menninger hoffman burk reece).in.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/03/04 12:17
L4	409	3 and (distributor supplier)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/03/04 12:06
L5	174	4 and contract	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/03/04 12:07
L6	171	5 and order	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/03/04 12:07
L7	163	6 and manag\$5	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/03/04 12:08
L8	119	7 and compar\$3	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/03/04 12:08
L9	111	8 and (discrepancy error problem incorrect)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/03/04 12:10
L14	2068	1 and (distributor buyer)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/03/04 12:15
L17	1483	14 and (supplier seller)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/03/04 12:16
L18	68	17 and ((independent separate distinct) near4 manager)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/03/04 12:17

Considered all

*Consolidated all*

L19	64	18 and contract	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/03/04 12:17
L20	4	19 not (menninger hoffman burk reece).in.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/03/04 12:17
S1	4953	705/7.ccls. 705/10.ccls. 705/26.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/02/19 16:40
S2	339	(705/7.ccls. 705/10.ccls. 705/26.ccls.) and "supply chain"	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/03/04 12:05
S3	287	((705/7.ccls. 705/10.ccls. 705/26.ccls.) and "supply chain") not (menninger hoffman burk reece).in.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/03/04 12:05
S4	232	((((705/7.ccls. 705/10.ccls. 705/26.ccls.) and "supply chain") not (menninger hoffman burk reece).in.) and (distributor supplier)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/03/04 12:06
S5	204	(((((705/7.ccls. 705/10.ccls. 705/26.ccls.) and "supply chain") not (menninger hoffman burk reece).in.) and (distributor supplier)) and identif\$5	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/02/19 16:43
S6	47	((((((705/7.ccls. 705/10.ccls. 705/26.ccls.) and "supply chain") not (menninger hoffman burk reece).in.) and (distributor supplier)) and identif\$5) and bid	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/02/19 16:43
S7	38	((((((((705/7.ccls. 705/10.ccls. 705/26.ccls.) and "supply chain") not (menninger hoffman burk reece).in.) and (distributor supplier)) and identif\$5) and bid) and contract	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/02/19 16:43
S8	33	(((((((((705/7.ccls. 705/10.ccls. 705/26.ccls.) and "supply chain") not (menninger hoffman burk reece).in.) and (distributor supplier)) and identif\$5) and bid) and contract) and search	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/12 15:00
S9	2	"20030212610".pn.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2004/04/12 15:00

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S10	138	((705/7.ccls. 705/10.ccls. 705/26.ccls.) and "supply chain") not (menninger hoffman burk reece). in.) and (distributor supplier) and contract	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/03/04 12:04
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### Search Report

Database Name	Database Number
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ABI/INFORM	15
PROMT (90-PRESENT)	16
PROMT (1972-1989)	160
COMPUTER DATABASE	275
TRADE&INDUSTRY	148

Set	Description
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S1	((manag? AND contract AND (supplier OR seller) AND order) AND ((discrepancy OR error OR incorrect)))
S2	PY=((1970:2001))
S3	S1 and S2
S4	S3
S5	(electronic or cyber or online or on()line or internet or virtual or web)(n2)(shop? Or retail? Or mall? ? Or catalog?) or e()(shop or tail) or teleshop? Or videotext?(n2)shop? Or PC=7372640
S6	s4 and s5
S7	RD
S8	SORT /ALL/pd,a

- 
- ☐ 1 The 400 richest people in America. - Oct 1 - 1984 - Gale Group Trade and Industry Database™
  - ☐ 2 25 top personal finance programs. - Nov - 1984 - Gale Group Trade and Industry Database™
  - ☐ 3 D-I-Y project guide. (includes related articles on sales aids) (Special Advertising Supplement) - Oct - 1988 - Gale Group Trade and Industry Database™
  - ☐ 4 Second Annual Directory of Human Resources Services, Products and Suppliers, January 1989. (directory) - Jan - 1989 - Gale Group Trade and Industry Database™
  - ☐ 5 Top 10 bank software growth companies. (company profile) - Feb - 1989 - Gale Group Computer Database™
  - ☐ 6 15 ways to improve inventory performance fast. - April - 1989 - Gale Group Trade and Industry Database™
  - ☐ 7 The future of transactional card technologies. - July-August - 1989 - Gale Group Trade and Industry Database™

- ☐ 8 Systems librarian and automation review. - Nov - 1989 - Gale Group Trade and Industry Database™
- ☐ 9 Database directory 1990. (buyers guide) - Jan - 1990 - Gale Group Computer Database™
- ☐ 10 35th anniversary: 1955-1990; American Society for Industrial Security International. (special supplement: includes articles on leaders, membership, chapters, committees, education, publications, certification & finances) - June - 1990 - Gale Group Trade and Industry Database™
- ☐ 11 TI WINS FORD CONTRACT TO DEVELOP COMPUTERIZED PUBLICATION DISPLAY SYSTEM - August 19 - 1991 - Word Count: 621 - Gale Group PROMT®
- ☐ 12 Unisys Defense Systems, Inc., Communications Systems Division. (Defense Contracts) - Oct 11 - 1991 - Gale Group Trade and Industry Database™
- ☐ 13 An explosion in micro-based systems. (includes buying tips) - Nov - 1991 - Gale Group Trade and Industry Database™
- ☐ 14 Retail supply chain electronic data interchange: The distribution contractor's role - 1992 - Word Count: 2613 - ABI/INFORM®
- ☐ 15 Network Dyads in Entrepreneurial Settings: A Study of the Governance of Exchange Relationships - Mar 1992 - Word Count: 12371 - ABI/INFORM®
- ☐ 16 The Billionaires - Sep 7, 1992 - Word Count: 17584 - ABI/INFORM®
- ☐ 17 The Billionaires. (A descriptive listing of the world's 233 wealthiest people)(Illustration) (Cover Story) - Sept 7 - 1992 - Gale Group Trade and Industry Database™
- ☐ 18 What do customers want? ask them! (ACCO USA Inc. institutes changes in service in response to customer survey results) - Dec - 1992 - Gale Group Trade and Industry Database™
- ☐ 19 Who's showing what where - May 15, 1993 - Word Count: 19597 - ABI/INFORM®
- ☐ 20 Software packages get more sophisticated. (Directory) - May 15 - 1993 - Gale Group Trade and Industry Database™

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 PROMT (1972-1989)       160  
 COMPUTER DATABASE       275  
 TRADE&INDUSTRY           148

**Set                                      Description**

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    error OR incorrect)))  
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 S3                                   S1 and S2  
 S4                                   S3  
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    internet or virtual or web)(n2)(shop? Or retail?  
 S5                                   Or mall? ? Or catalog?) or e()(shop or tail) or  
    teleshop? Or videotext?(n2)shop? Or  
    PC=7372640  
 S6                                   s4 and s5  
 S7                                   RD  
 S8                                   SORT /ALL/pd,a

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- ☐ **21** Retail tech hits its stride. (includes related articles) - Jan - 1994 - Gale Group Trade and Industry Database™
- ☐ **22** Publishing on the Internet for fun and profit. (includes related articles on TCP/IP Internet communications protocol, the Interpedia public domain encyclopedia project on the Internet, observations on using Internet access software and printed and online resources about setting up Internet businesses) - April 4 - 1994 - Gale Group Computer Database™
- ☐ **23** ABA at LA: the most complete listing of exhibitors, offers, events. (1994 American Booksellers Association convention: Los Angeles, California)(includes related articles on Los Angeles and on the convention schedule and booth assignments) (Cover Story) - May 2 - 1994 - Gale Group Trade and Industry Database™
- ☐ **24** Bulletin boards. - June - 1994 - Gale Group Computer Database™
- ☐ **25** The trillion dollar risk - Sep 1994 - Word Count: 4576 - ABI/INFORM®

- ☐ 26 Brave new world: what a working librarian should know about living on the Internet. (includes related articles on Internet sites, sources and the virtual public library) - March - 1995 - Gale Group Trade and Industry Database™
- ☐ 27 Booth directory for Nexpo 95 Who's showing what where - May 27, 1995 - Word Count: 23968 - ABI/INFORM®
- ☐ 28 Dana part of MEB solution - Jul 1995 - Word Count: 1565 - ABI/INFORM®
- ☐ 29 Plastics technology: manufacturing handbook & buyers' guide 1995/96.(Buyers Guide) - August - 1995 - Gale Group Trade and Industry Database™
- ☐ 30 Managing electronic commerce on the Federal acquisition computer network (FACNET) - 1996 - Word Count: 8994 - ABI/INFORM®
- ☐ 31 Take charge of your money. (evaluation of four personal finance programs) (includes related articles on online investing, shopping online, tech support on the Web) (Software Review)(Evaluation) - Jan - 1996 - Gale Group Computer Database™
- ☐ 32 Reengineering materials management: Opportunities for electronic technology implementation - Feb 1996 - Word Count: 5175 - ABI/INFORM®
- ☐ 33 Evaluated receipts and settlement at Bell Atlantic - Jun 1996 - Word Count: 2029 - ABI/INFORM®
- ☐ 34 Change buffets PT firms: survival skills become a priority. (power transmission distributors and manufacturers)(Power Transmission Technology: Coping with Change) - July - 1996 - Gale Group Trade and Industry Database™
- ☐ 35 Nexpo '96, II: editorial and advertising systems and electronic publishing. (includes related article on Freedom System Integrators' addition of Phrasea to its product line) (Industry Trend or Event) - July 29 - 1996 - Gale Group Computer Database™
- ☐ 36 Are corporate procurement cards for you? (includes related article on buying and paying trends) - Sep - 1996 - Gale Group Trade and Industry Database™
- ☐ 37 Physical reality, mental agility-distribution in the information age. (includes related articles on the effects of interacting technology on banking, sophisticated management systems for automobile mechanics) (Technology Information) - Oct - 1996 - Gale Group Computer Database™
- ☐ 38 The offering and distribution of securities in cyberspace: a review of regulatory and industry initiatives.(Blue Sky Survey) - Nov - 1996 - Gale Group Trade and Industry Database™
- ☐ 39 The management of success from A to Z. (management strategies of winning companies)(Canada's 50 Best Managed Private Companies)(Company Profile) - Dec 14 - 1996 - Gale Group Trade and Industry Database™
- ☐ 40 25 winning technologies.(IW's 4th Annual Technology & Innovation Awards) - Dec 16 - 1996 - Gale Group Trade and Industry Database™

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 TRADE&INDUSTRY       148

**Set                                      Description**

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    internet or virtual or web)(n2)(shop? Or retail?  
 S5                                      Or mall? ? Or catalog?) or e()(shop or tail) or  
    teleshop? Or videotext?(n2)shop? Or  
    PC=7372640  
 S6                                      s4 and s5  
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- ☐ **41** Production listings. (periodical publishing)(Directory) - Annual - 1997 - Gale Group Trade and Industry Database™
- ☐ **42** Beyond outsourcing: Managing IT resources as a value center - Spring 1997 - Word Count: 7926 - ABI/INFORM®
- ☐ **43** Commerce One Delivers Industry's First Real-Time End-to-End Solution for Interbusiness Electronic Commerce. - April 7 - 1997 - Word Count: 1432 - Gale Group PROMT®
- ☐ **44** Set sale on the 'Net. (generating sales through Internet sites; includes related articles)(Success in Cyberspace: Sales & Marketing: The Internet, Part 1) - April 21 - 1997 - Gale Group Trade and Industry Database™
- ☐ **45** For your eyes only... - May 22, 1997 - Word Count: 1776 - ABI/INFORM®
- ☐ **46** Strategic channel design - Summer 1997 - Word Count: 6760 - ABI/INFORM®



- ☐ 47 1997 Buyer's Guide and Consultant Directory.(for libraries)(Buyers Guide) - July-August - 1997 - Gale Group Trade and Industry Database™
- ☐ 48 Commercial decisions. (Electronic Commerce: Management) (includes a related article listing management issues) (Internet/Web/Online Service Information) - July 24 - 1997 - Gale Group Computer Database™
- ☐ 49 Give your site some credit: preparing your Web site to handle credit-card transactions. (includes related article on do-it-yourself commerce sites) (Internet/Web/Online Service Information)(Tutorial) - Sep - 1997 - Gale Group Computer Database™
- ☐ 50 What's your E-D-IQ? (electronic data interchange) (includes related article)(Warehousing & Logistics II) - Oct 15 - 1997 - Gale Group Trade and Industry Database™
- ☐ 51 A survey of selected federal regulatory and legal developments in electronic financial services - Nov 1997 - Word Count: 22168 - ABI/INFORM®
- ☐ 52 American Companies in Japan: SOFTWARE AND INFORMATION SERVICES - Nov 30 - 1997 - Word Count: 4090 - Gale Group PROMT®
- ☐ 53 Electronic commerce - Dec 1997 - Word Count: 3940 - ABI/INFORM®
- ☐ 54 Pepsi's next generation of purchasing.(Champions of Change) - Dec - 1997 - Gale Group Trade and Industry Database™
- ☐ 55 Purchasing is ready - finally!(includes related articles on auto industry internet plan and Lockheed intranet) (Special Internet Report) - Dec 11 - 1997 - Gale Group Trade and Industry Database™
- ☐ 56 Selecting a Z39.50 client or Web gateway - 1998 - Word Count: 8515 - ABI/INFORM®
- ☐ 57 Supply chain relationships within airport retailing - 1998 - Word Count: 5552 - ABI/INFORM®
- ☐ 58 Outsourcing: Newman Library, Baruch College/ CUNY - 1998 - Word Count: 3073 - ABI/INFORM®
- ☐ 59 SPECS 98: wrap-up coverage of Chain Store Age's 34th annual Store Planning Equipment and Construction Services Seminar.(related articles) - May - 1998 - Gale Group Trade and Industry Database™
- ☐ 60 Those adept at cost removal are more likely to flourish. - May 7 - 1998 - Gale Group Trade and Industry Database™

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 S6                      s4 and s5  
 S7                      RD  
 S8                      SORT /ALL/pd,a

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- ☐ **61** The Strength Of a Convoy Of Buyers. (Vipar Heavy Duty Inc consortium) (Company Operations) - June 1 - 1998 - Gale Group Computer Database™
- ☐ **62** Untangling the Web: A review of certain secure e-commerce legal issues - Jul 1998 - Word Count: 10700 - ABI/INFORM®
- ☐ **63** 1,001 ways to buy PCs - Jul 1998 - Word Count: 2331 - ABI/INFORM®
- ☐ **64** Statements to Congress. - August - 1998 - Gale Group Trade and Industry Database™
- ☐ **65** In pursuit of technical excellence. (GE Supply) - Sept - 1998 - Gale Group Trade and Industry Database™
- ☐ **66** BUILDING A BUSINESS PLAN FOR AN E-COMMERCE PROJECT.(Internet/Web/Online Service Information) - Sept 15 - 1998 - Word Count: 3501 - Gale Group PROMT®
- ☐ **67** The Home Shopping Network To Increase Customer Service With Optum SCE Series. - Dec 7 - 1998 - Word Count: 698 - Gale Group PROMT®

- ☐ 68 E-avalanche - 1999 - Word Count: 4411 - ABI/INFORM®
- ☐ 69 Organizing and managing channels of distribution - Spring 1999 - Word Count: 11983 - ABI/INFORM®
- ☐ 70 PRODUCTION.(catalog production services) - April - 1999 - Word Count: 19708 - Gale Group PROMT®
- ☐ 71 Y2K liability crisis looms. - April - 1999 - Word Count: 472 - Gale Group PROMT®
- ☐ 72 UCC 2B: The New Law of Shrink-Wrap.(Industry Trend or Event) - April 19 - 1999 - Word Count: 5460 - Gale Group PROMT®
- ☐ 73 Price survey. - May - 1999 - Word Count: 10377 - Gale Group PROMT®
- ☐ 74 Delegates get the lowdown on e-com - May 27, 1999 - Word Count: 826 - ABI/INFORM®
- ☐ 75 Web trust: a seal of approval.(World Wide Web sites) - June - 1999 - Gale Group Trade and Industry Database™
- ☐ 76 Intelisys and Newark Electronics Partner to Serve Global Electronic Procurement Customers. - June 21 - 1999 - Word Count: 530 - Gale Group PROMT®
- ☐ 77 Mobile E-Commerce Evolves.(Internet)(Internet/Web/Online Service Information) - July - 1999 - Gale Group Computer Database™
- ☐ 78 Supply Chain -- Think A Chain Of Efficiencies.(electronic commerce)(Industry Trend or Event) - Oct 25 - 1999 - Word Count: 2239 - Gale Group PROMT®
- ☐ 79 E-Procurement -- Holy Grail: A Single Purchasing Interface.(Industry Trend or Event) - Oct 25 - 1999 - Word Count: 1416 - Gale Group PROMT®
- ☐ 80 A matter of trust.(BMG Distribution, e-Steel and other business-to-business e-commerce sites work to build trust)(Company Business and Marketing) - Oct 25 - 1999 - Gale Group Trade and Industry Database™

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 S7                                      RD  
 S8                                      SORT /ALL/pd,a

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- ☐ **81** Think twice or pay the price.(electronic commerce)(Industry Trend or Event) - Oct 28 - 1999 - Word Count: 1575 - Gale Group PROMT®
  - ☐ **82** Manufacturers and Suppliers.(Alphabetical list of companies) - Nov - 1999 - Word Count: 71777 - Gale Group PROMT®
  - ☐ **83** Arrow adds weapon to online arsenal.(Arrow Electronics' PROseries e-commerce suite)(Product Announcement) - Nov 8 - 1999 - Word Count: 1132 - Gale Group PROMT®
  - ☐ **84** Your questions answered.(Questions and Answers)(Column) - Dec - 1999 - Gale Group Computer Database™
  - ☐ **85** E - Business Makeover.(Company Business and Marketing) - Dec 7 - 1999 - Gale Group Computer Database™
  - ☐ **86** NOTEBOOK. - Dec 20 - 1999 - Word Count: 3405 - Gale Group PROMT®
  - ☐ **87** GENERAL APPLICATIONS/SYSTEM SOFTWARE.(Buyers Guide) - Jan - 2000 - Word Count: 14041 - Gale Group PROMT®

- ☐ **88** Critical review - outsourcing: A paradigm shift - 2000 - Word Count: 20921 - ABI/INFORM®
- ☐ **89** The battle to control online purchasing - Jan/Feb 2000 - Word Count: 2953 - ABI/INFORM®
- ☐ **90** BEHOLD THE VIEW. - Jan - 2000 - Gale Group Trade and Industry Database™
- ☐ **91** Hi-tech procurement - Feb 2000 - Word Count: 1897 - ABI/INFORM®
- ☐ **92** FUTURE VISION OF COMMERCE SOFTWARE.(Sears, BroadVision alliance)(Industry Trend or Event) - Feb 15 - 2000 - Word Count: 3514 - Gale Group PROMT®
- ☐ **93** The B2B tool that really is changing the world - Mar 20, 2000 - Word Count: 3954 - ABI/INFORM®
- ☐ **94** BIRTH OF A Website. - April - 2000 - Word Count: 5011 - Gale Group PROMT®
- ☐ **95** Ready For Market!(Industry Trend or Event) - April - 2000 - Word Count: 14848 - Gale Group PROMT®
- ☐ **96** Technological communication: The ethical and legal implications for managers and public administrators - Spring 2000 - Word Count: 4618 - ABI/INFORM®  
PDF Document  
Text and Graphic Document
- ☐ **97** The First Amendment's limitations on the use of Internet filtering in public and school libraries: What content can librarians exclude? - Apr 2000 - Word Count: 20618 - ABI/INFORM®  
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Text and Graphic Document
- ☐ **98** Thoughts for Risk Managers. - May - 2000 - Gale Group Trade and Industry Database™
- ☐ **99** Exposed on the net: A comparison of Internet business exposures with standard business policies - Summer 2000 - Word Count: 11448 - ABI/INFORM®  
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- ☐ **100** Sybase Introduces Telecom B2B+I: Web-Based Customer Self Service Capability for Telecommunications Industry. - July 31 - 2000 - Word Count: 921 - Gale Group PROMT®

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 S6                                      s4 and s5  
 S7                                      RD  
 S8                                      SORT /ALL/pd,a

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- ☐ **101** The Century Club. - August - 2000 - Word Count: 19946 - Gale Group PROMT®
  - ☐ **102** Industry Suppliers.(Product Information)(Brief Article) - Sept - 2000 - Word Count: 20446 - Gale Group PROMT®
  - ☐ **103** Plan For Fulfillment. - Sept 15 - 2000 - Word Count: 5461 - Gale Group PROMT®
  - ☐ **104** An eye for detail - B2B exchanges force cleanup of supplier data.(Industry Trend or Event) - Sept 25 - 2000 - Word Count: 1869 - Gale Group PROMT®
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 **Fulltext available through:** [USPTO Full Text Retrieval Options](#)**Supply chain relationships within airport retailing**

Freathy, Paul O'Connell, Frank

*International Journal of Physical Distribution & Logistics Management* , v28n6 , Page: 451-462 , 1998

Airport retailing is an under-researched area of study. It is also a sector displaying significant year-on-year growth. This paper examines the structure of the supply chain within airport retailing and the main factors that differentiate it from its downtown counterpart. It describes the structure and operation of the supply chain within European airport retailing and the main sources of power that retailers and suppliers draw on in the negotiating process. The paper concludes that, relative to other retail sectors, relationships within the airport retailing supply chain are technologically unsophisticated and based on conventional market exchange principles.

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**Introduction**

There has been considerable academic attention devoted to understanding contemporary developments within the retail sector. This is due to the central role that the distributive trades now play within the economy of many countries, both as generators of employment and as contributors to gross domestic product. Sectors of retailing such as grocery, fashion and convenience have benefited from increased levels of academic enquiry. However, far from being over-researched, the dynamic and continually changing nature of the sector has ensured that new markets, new strategies and new operational practices are constantly emerging. Home shopping, Internet retailing, warehouse clubs and hospital retailing have all taken the research focus outside of the traditional high street or out-of-town development.

Airports have been classed under the general heading of proximity retailing, but this situation may be changing. As will be highlighted in this paper, structural changes within the air transport industry have prompted a re-assessment of the role that retailing plays within its economy. Its importance as a revenue generator and contributor to overall profitability has increased markedly. Despite this change, airport retailing and its supply chain operations have remained an under-researched area of academic study. The aim of this paper is to rectify partially this deficiency. Its purpose is to describe the structure of supply chain operations, drawing from a recent survey of European operations, within airport retailing and to examine the relationships that exist between different channel members.

The paper will first provide the context for the research and detail the main changes that have occurred within the air transport industry. A brief overview of the concept of power and how it manifests itself within the retail supply chain will then be provided. The paper will then highlight the structure of the supply chain within airport retailing, before examining the nature of power relationships within the industry. The final section will draw some conclusions regarding likely developments in the airport retail supply chain.

## Strategic change within the airport sector

Traditionally, airports have been administered and controlled directly by the state or by a body appointed on its behalf such as a government department or a company dedicated to the management of airports. While it remains accurate to suggest that the majority of airports throughout the world still have some form of public sector ownership, the level of operational control exercised by central government may be adjusted to reflect the greater participation of private sector interests.

Smith (1997) maintains that airport deregulation has been prompted primarily by the state's desire to avoid the financial burdens associated with subsidising airport capital investment. Airports have traditionally had to compete with other areas of public expenditure such as education, health and defence. The increasing pressures associated with operating an airport arguably have led to a realization that the European air transport industry is in a mature, competitive market which needs to be run according to commercial rather than state principles.

The capital required to develop and maintain airports is generated from two sources; aeronautical and commercial. Aeronautical income includes landing fees, passenger levies and ground handling charges. Commercial revenue includes car parking, rentals, restaurants and bars as well as retail revenue (Doganis 1992). Papagiorcopulo (1994) maintains that commercial income has increased in importance due primarily to the fact that aeronautical revenue has declined as a result of intense competition within the airline industry. The charges made by airports to airlines for using their facilities have tended to remain static as airline authorities have sought to operate on limited margins and to keep fares low. Airports have therefore been compelled to look at ways of increasing the revenues derived from commercial enterprise and in particular expanding their retail operations.

The growth of airport retailing has provided significant opportunities for the operating authorities. There has been a rapid expansion in the amount of space dedicated to retail developments and an expansion in the number and types of retailers trading within airport terminals (Freathy and O'Connell, 1998; Humphries 1996). Compelled to be proactive in their generation of revenue, many airport authorities now derive more income from their commercial activities than from their aeronautical charges. For example, BAA announced that retail revenues accounted for 52 per cent of the company's total income in the year to March 1998 (DFB, 1998).

Given the role that retail activities play in ensuring the competitiveness and long-term survival of the airport industry, the operation of the supply chain and the factors that govern relationships between channel members would appear to be of some importance. Prior to detailing the findings of our empirical research, it will be useful to conceptualise briefly the theoretical base on which such relationships are founded.

## Power in the supply chain

The supply chain and the interaction between supplier and retailer have traditionally been predicated on the notion of some form of power relationship. How power is characterised and the way in which it manifests itself within channels has been the subject of considerable academic debate (Dickinson and Hollander, 1996; El-Ansary and Stern, 1972; Emerson, 1962; French and Raven, 1959; Gaski, 1996; Magrill, 1996; Mallen, 1996a, 1996b; Stern and El-Ansary, 1988; Stannack, 1996). Much of the literature concentrates on trying to develop a means of identifying and measuring power, although Gaski (1984) maintains that there is no single definition of what construes the key elements of power.

Similarly, the concepts of "partnering" and "alliances" have been well documented in recent supply chain literature (Ackerman, 1996; Blancero and Ellram, 1997; Frankel et al., 1996; Krause and Ellram, 1997; Campbell, 1997; Wren and Simpson, 1996; Smith, 1997; Tate, 1996). Reinforcing one of the findings that will be presented in this research, the diversity of operating practices within the retail sector makes it impossible to identify a single form of channel relationship. The structure that the supply chain takes will vary from a basic market exchange relationship to more sophisticated forms of interaction based on the concepts of exchange and mutuality.

Lusch (1982) identified the conventional channel as a loosely-aligned, fragmented, series of paired relationships (dyads) between different members of the supply chain, for example, manufacturer - wholesaler; wholesaler-retailer; retailer-consumer. The priority in these joint interactions is often the establishment of control. Traditionally the relationship has tended to be based on market exchange principles. For example, buyers and suppliers negotiate over prices, volumes and margins. While mutual trust may be absent in the initial stages of the relationship, interdependence does develop and, depending on the working relationship existing between the two parties, can increase over time (Dwyer et al., 1987). Nowadays there is a tendency to regard such an approach as an inefficient method of distributing product and characterised by unduly high levels of distrust, rivalry and secrecy.

The competitive nature of the retail sector has led to a reassessment of strategy. In an attempt to improve margins and develop a sustainable competitive advantage, a number of retail organisations have sought to improve the working relationships they have with their suppliers. By moving away from a conflictual approach, emphasis has been placed on improving communication, sharing information and co-operating more fully. Such relationships are long-term, they encourage discussion and negotiations and they cover a wide range of supply chain issues including product characteristics, quality management and new product development. This vertical marketing system (VMS) is premised on the notions of trust and co-operation.

Since the mid-1980s vertical marketing systems have grown in popularity and are often championed by one (often the most dominant) member of the channel. Perhaps reflecting their increased market power, the initiative for the development of vertically co-ordinated systems often has been the retail sector. Such agreements place a number of obligations on all parties within the supply chain concerning issues such as quantities, deliveries, support services, marketing information advice and production assistance. The extent to which contractual systems operate effectively is a function of the market power exercised by individual organisations within the chain and the degree to which this power is viewed as legitimate. Fernie (1995) notes that many manufacturers were initially hostile to the notion of partnership; however, the growth of private label and own brands provided the impetus for closer contractual ties.

While vertical systems have been advocated on the basis of productivity and efficiency, few supply chains remain devoid of conflict (Sachdev et al., 1995); indeed, channel conflict may be deemed inevitable between channel members (Gaski, 1984). Securing agreement on each member's role is vital for VMS to work effectively. If any part of the supply chain process remains unaccountable then the holistic ethos of total responsibility becomes unachievable and the channel may revert to a contractual, exchange-based relationship.

## Methodology

The air transport industry may be characterised as dynamic and in a period of structural transition. Within this framework, retailer-supplier relations must be somewhat transient and there may be no uniform approach to the supply chain process. The diversity of airport retail operations has given rise to a complex set of relationships that may vary by country, size of airport, level of state ownership and product group. What is discussed in the following section represents a broad aggregation of the different

structures found within the industry.

For the purposes of this research a qualitative research framework was considered to be the most appropriate. The research findings presented here are based on 16 qualitative interviews with key decision-makers within the airport retailing sector. Information was collected over an eight-month period between October 1996 and June 1997. Interviews were conducted with representatives of the Dutch, UK, Irish and French airport authorities. In addition, three retailers of tax-free cosmetics and perfumes were interviewed as well as five major retailers of alcohol and tobacco. Two of these eight retailers had operations in the domestic market in addition to their airport trading activities.

To gain a supply side perspective, two of the largest duty free suppliers to the industry were interviewed. Finally, two consultants to the air transport industry were questioned in an attempt to gain an independent perspective on supply chain relationships. With the exception of the two consultants, the interviews were conducted either with the commercial manager, the category manager or the logistics manager of each company. The interviews were designed to gain an understanding of product and information flows, the sources of conflict that arise within the supply chain and the basis of each party's negotiating power. The paper attempts to provide an overview of supply chain relationships within European airport retailing, but has two limitations. First, it does not consider in detail any differences that may exist between different sized airports. Second, it was not possible to gain access to any of the major perfume houses. For this product category the research findings are therefore based only on the retailer's perspectives of supply chain relationships.

### The supply chain process

Trading in an airport environment creates a series of unique constraints on the retailer. As a consequence, the demands placed on each party within the supply chain are different from those experienced in other retail sectors. The research identified three factors that differentiate airport retailing from its domestic counterpart.

First, the demand for specific products within an airport is a function of the volumes and types of passengers travelling, rather than the time of year. While there was additional demand during the summer period, the industry did not experience the peaks and troughs associated with sales in the domestic market. Demand is relatively predictable when compared to the high street. This situation was particularly true in the liquor and tobacco sectors. The research revealed that liquor and tobacco retailers viewed their product categories as stable, volume businesses. Sales patterns can therefore be forecast with a high degree of accuracy. The sale of perfume and cosmetic goods displayed greater seasonality and product demand was seen as more difficult to predict. All three of the retailers interviewed in this sector felt that the control and availability of stock had improved through the introduction of EPOS and other forms of electronic information systems.

A second feature of airport retailing is the disproportionately high concentration of sales in specific product areas. Alcohol, tobacco and perfume dominate airport retailing and account for 74 per cent of all airside sales (Best and Most, 1996). This represents the primary source of retail revenue for the airport operator. The efficiency of the supply chain in these product categories, therefore, is critical to the overall success of the airport's commercial strategy.

A third factor that differentiates airport retailing from domestic retailing is the absence of income duty and/or value-added tax on a wide range of products. Travelling passengers are constrained as to the quantities of duty/tax-free goods they may buy on any one trip. The system is regulated through the customs authority, whose role it is to ensure that consumers do not purchase excess quantities and that all

duty- and tax-exempt goods are fully accounted for by the retailer. Such external mediation has a number of consequences for the way in which airport retailing operates and the way in which the supply chain is administered and controlled.

One approach to understanding the supply chain process has been to divide it into four stages: ordering; the supply of the product; warehousing, storage and inventory management; and the movement of product from warehouse to the point of sale (Figure 1).

### Ordering process

Because of the high volumes of tobacco and liquor sold in duty free, product demand was reviewed and ordered by the retailers on a weekly basis. The majority of orders were placed manually with suppliers. The research revealed only limited evidence of technological innovation within the supply chain. While there were some notable exceptions, e.g. Heinemann's integrated distribution network, systems such as electronic data interchange (EDI) and just-in-time (JIT) were found to be conspicuously absent.

Two reasons were put forward by the interviewees to account for this. First, the focus of the liquor and tobacco retailers had been primarily on front-end systems and volume output. Supplier integration and co-operation had not been deemed a priority. As one commercial manager remarked:"

The company has concentrated its energies on getting our front-of-house in order. We have spent a lot of time working on our merchandising and product assortment and trying to improve our levels of customer service. Investing in an ordering system and working more closely with suppliers has not really been seen as a priority by the company."

Second, the speed with which the largest liquor and tobacco retailers have grown has meant that their existing systems have been rendered obsolete earlier than predicted. Of the five liquor and tobacco retailers interviewed, four maintained that their distribution and inventory ordering systems found it difficult to cope with the increased volumes. The consequences of this have been a slower order cycle time, a higher likelihood of delivery and receipt error and an increased propensity for stock-outs.

When supplying liquor and tobacco to retailers, manufacturers attempted to work on a seven-day lead time from ordering to supply. Achieving this was in part assisted by the predictability of demand for both the product categories. In contrast, perfume and cosmetics tended to have a longer order cycle time. While the perfume retailers noted that it was standard to review demand for such products on a weekly basis, product was supplied in an average three- to four-week delivery cycle.

### Supply of the product

The methods used by suppliers to distribute goods to the retailer's warehouse depended on a variety of factors, including the range of products stocked, the extent of the company's purchasing power and whether a centralised or regional warehouse system was in operation. The majority of tax- and duty-free merchandise was delivered on pallets directly from the manufacturer's bonded warehouse to the retailer. Both of the manufacturers interviewed used their own vehicle fleet and there was little evidence of sub-contracting. It was felt by both companies that the delivery of bonded product was a specialised skill. For example, to conform to the regulations laid down by the customs authority, all tax- and duty-free products transported between the supplier and the retailer must be accounted for. In some instances, the supplier will also have to seek approval from the customs for their shipment routes. The administrative arrangements that surrounded the distribution of goods were considered to be complex and best handled by the manufacturers themselves.

While the research identified little evidence of supplier-retailer partnerships, both manufacturers did note that the duty- and tax-free retailers were placing greater demands on them. Reflecting the increase in market power achieved through increased product volumes, retailers expected the merchandise to be packaged to their own specifications. This included bespoke orders that detailed specific sizes, styles and colours. Retailers also expected the merchandise to be pre-priced and bar-coded by the time it arrived at the warehouse.

### Warehousing, storage and inventory

One of the greatest difficulties in warehousing tax- and duty-free products is coping with the high volume demand. Space in an airport terminal remains at a premium and it is the responsibility of the airport authority to balance the demands of both commercial and aeronautical interests. Because of the high rentals charged for space by the airport operators, one strategy adopted by the retailers is to keep the amount of rented storage space to a minimum and establish warehouse facilities outside the airport environs.

Two of the companies in the survey were retailers with a national network of stores in the domestic market. Both companies "piggybacked" their airport operations onto their existing distribution networks and were therefore able to supply their stores directly from their central warehouse. In addition, both companies used a version of their domestic inventory control system and were thus able to adapt existing technology to suit the specific demands of the airport environment. By utilising their existing distribution infrastructure the retailers were able to enjoy scale economies while keeping the amount of rented, stock-holding space within the airport to a minimum.

In contrast, those retailers who specialised in airport trading and had no domestic operations faced the dilemma of whether to rent storage space from the airport authorities or source alternative warehousing in the local environs. As one perfume and cosmetic retailer noted:"

The rental for warehouse space at the airport is prohibitive for a company such as ours. They [the airport authorities] would charge us ten times more than providers in the local area. I can also get the equivalent amount of office space eight times cheaper than I would in the airport. It is more economical for my company to base itself outside the airport and supply my shops by making three eight kilometre return journeys per day."

The control of inventory was also of particular concern to duty- and tax-free retailers. In addition to the associated loss of revenue associated with shrinkage and stock-outs, retailers have to account to the customs authority for the sale of all bonded merchandise. As both duty-free shops and warehouses are designated as bonded areas, this requires an extra layer of accounting and inventory management. Customs demand complete accuracy from airport retailers and expect their products to be accounted for by both product group and size of unit. For example, in the case of alcohol, retailers have to account for the sale of all whisky across litre, 70cl- and 50cl-sized bottles.

Any subsequent inaccuracies in inventory levels can result in fines by the customs authorities at penal rates. This usually means that the product with the highest excise rate is chosen and applied to all merchandise variances. Any breakages have to be officially accounted for. In the case of duty free, the damaged items have to be handed over to the customs for disposal. For example, one alcohol retailer interviewed was required to provide the unopened neck of any broken bottle in order to demonstrate that the product had been damaged. If the company was unable to provide such evidence the item appeared as a stock shortage and was liable for VAT and duty charges.

## Movement of product from warehouse to point of sale

The control of stock has been aided by the investment in EPOS systems. Stock accuracy is again a central concern, as once a product has been removed from a bonded warehouse it cannot be returned. Deliveries from the retailer's bonded warehouse to the airport outlet are usually accompanied by a warrant, which details the contents of the consignment and is used as a control check by the local customs authority. The role of the customs at this stage is to ensure that whatever stock leaves the warehouse equates exactly to retail sales plus stock on hand in the shop.

The decision to use third-party sub-contractors or undertake distribution in-house tends to depend on a variety of factors. For example, if the retailer is a national operator with a portfolio of domestic stores, then the airport outlets are likely to be part of the company's overall distribution strategy. In addition to this however, factors such as the location of the airport, the product composition, the number of persons travelling and the product volumes all influence the retailer's decision over whether to sub-contract its distribution.

Among the tobacco and liquor retailers interviewed, there was little evidence of third-party sub-contracting. All five used their own in-house distribution network to move products to their stores. Under bond regulations, all goods must remain in unopened cases while in the warehouse. This led to the view (which may be contrary to that held by manufacturers) that such merchandise was relatively "simple" and "straightforward" to transport. In addition, the volume of product demanded in duty free merited full vehicle loads without the need to consider using third-party composite deliveries.

Third-party contracting was considered to be most likely when a tax-free retailer operated from a small, regional airport and product volumes were not large enough to justify in-house deliveries or investment in separate warehousing facilities. In such circumstances the retailer used the composite warehouses of independent third-party contractors to manage inventory and distribute direct to store.

## Power relationships within the supply chain

No party in the supply chain was able to entirely dominate relations and both retailers and suppliers were able to influence the negotiation process. The basis of power for each party stemmed from different sources. For the retailer, the first and most obvious related to the volumes demanded. The research revealed an average stock turn for perfume and cosmetics of four to six per annum, while in the duty-free, a stock turn as high as 15 was expected. Such volumes provide the retailer with a significant amount of negotiating leverage. A second and less obvious power source stems from the high profile exposure that a product can receive if stocked in an airport. Airport retailing acts as a shop window and an alternative distribution channel where suppliers can test market their goods prior to a full product launch.

The determination of some suppliers to have their product represented in an airport will not always be based purely on rational, economic judgement. As one duty-free retailer noted:

Suppliers are under a lot of pressure to ensure that we stock their product. They understand the value of profiling their products in the overseas market and test marketing to an international community as well as generating demand in the domestic market. It would also be unthinkable for one of their chief executives to come through the airport and see that his staff had failed to get the company's product on our shelves."

Mirroring other areas of retail development, airport retailing within Europe has been characterised by a



growing concentration of market share among a small number of operators. Airport retailers such as Heinemann, BAA, Aer Rianta and Weitnauer have adopted aggressive growth strategies and succeeded in strengthening their negotiating base. Suppliers however have not remained passive to the growing power of the retailer. In recognition of the importance of duty-free, the principal manufacturers have established specialist subsidiary companies to handle their world-wide duty- and tax-free sales. These organisations manage a portfolio of brands and represent the parent company in all aspects of negotiation. Suppliers such as Allied Domecq, Rothmans and United Distillers, all have global account managers responsible for individual clients. To further consolidate their power base, manufacturers have integrated forward into logistics and in some instances control over 80 per cent of individual product brand movements.

Within the tax- and duty-free industry there has also been a strategy of supplier consolidation. Major international brands have a tendency to change ownership on a regular basis. One outcome of this is that power has become concentrated among a limited number of multi-national corporations (Table I). For example, United Distillers control five of the world's top 20 brands of spirits.

International suppliers derive much of their power from the brand loyalty that they gain from their consumers. Creating a high profile marketing image gives the supplier scope to apply tight control over a range of operational areas. For example, two of the perfume retailers maintained that the major fragrance manufacturers exerted considerable influence over their trading activities. In order to be allowed to stock their products, a number of the perfume houses demanded quality fittings and displays, set retail prices relative to the domestic market and placed limits on the types of advertising that could be undertaken. Both companies felt that they were part of a process whereby the perfume manufacturers allocated the product to them rather than worked in any form of partnership or long-term relationship.

It would, however, be misleading to suggest that all relationships between retailer and supplier are conflictual in nature. The research identified the two parties as having a number of common objectives. For example, delivering customer service was considered to be a central method of improving gross margin and increasing volume. Maintaining product quality and reliability were also seen as priorities due to the difficulties and expense associated with returning defective merchandise. Suppliers and retailers alike felt that it was important to minimise mark-downs given the statutory limitations on purchase quantities imposed by most countries. For example, in order to protect their brand image and prevent the stock reaching the grey or parallel markets, the leading perfume houses did not allow discounting to clear slow or unwanted merchandise, preferring instead to exchange the stock for proven or new lines.

## Conclusions

The operation of the supply chain within airport retailing cannot be described as the most proactive or technologically advanced within the retail sector. While companies such as Heinemann operate centralised warehousing and "JIT" systems, such practices are not widespread. The growth of passenger traffic volumes has already provided the impetus for change and forced many airport retailers to reassess their approach to supply chain management. In order to remain competitive, airport retailers will need to invest further in information systems and attempt to improve the flow and handling of stock through the supply channel. On the basis of the research evidence, the areas most likely to receive immediate priority are:

The improved matching of inventory levels to anticipated traffic flows and special marketing events.

The development of information systems that allow a monitoring of the rate of sales, stock-in-hand and re-ordering times. This will allow a movement towards minimum stockholding and more accurate deliveries.

Direct supplier delivery to the shop floor for a select range of refrigerated and short shelf life products. This will free warehouse capacity and eliminate investment in chilling equipment.

A total distribution cost approach to review all physical distribution functions with a view to identifying cost and service benefits.

A movement by international airport retailers towards global pricing structures for their major international branded products.

The extent to which these improvements become adopted practice and manifest themselves within the culture of airport retailing will be partially dependent on the relationship between the retailer and their suppliers. Placing the airport supply chain within the theoretical framework identified previously allows a number of observations to be made. The use of conventional channels appears to be most in evidence within airport retailing. Relationships remain transactional in nature and in the case of tax-free shops involve many small suppliers providing merchandise with few additional services or benefits.

International suppliers derive much of their market power from the high profile image their brands convey. There is little evidence of a widespread use of own brands by airport operators; however, the emergence of multi-national airport retailers may encourage the development of own-label generic products.

Airport retailers have therefore focused on their core business and through centralised buying, exerted power on the basis of the volumes demanded. Smaller suppliers exhibit greater degrees of dependency on airport retailers and asymmetrical relationships are very much in evidence. There is only limited evidence of long-term supply chain relationships, although the opportunities exist to progress the supply chain beyond the traditional market exchange-based dyad. The possibility of moving towards a more integrated partnership, based on the principles of mutuality and exchange, exists, but as yet are not widespread.

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Caption: Figure 1; Supply chain for tax- and duty-free products; Table I; Major leading suppliers and brand ownership

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*Considered***Supply Chain -- Think A Chain Of Efficiencies.(electronic commerce)(Industry Trend or Event)**

Karpinski, Richard

*InternetWeek , Page: 73 , Oct 25 1999*

Want a peek at the topic that will dominate the discussion in Internet circles for the next year, just as portals and e-retailing set the pace a year ago and business-to-business commerce dominates the landscape today? Think supply chain.

What's the big deal? For companies that have sped through the initial phases of e-commerce-from brochureware and e-commerce transactions to early extranet connections-applying the Internet and the Web to their supply chain is the truest test of whether a business is really committed to becoming an e-business.

"It's a supply-chain vs. supply-chain world today. Companies don't only compete with each other but with an extended web of suppliers," says Rob Rodin, CEO of electronics distributor Marshall Industries.

Indeed, just as the assembly line symbolized the industrial age, the supply chain will become the symbol of the Internet age.

"Our children may be studying the Dell direct model-e-commerce driven by a fine-tuned supply chain-like we studied Henry Ford," says Alan Dabbiere, CEO of supply-chain vendor Manhattan Associates. "It is the evolution of how close you can get to your customer."

Users in InternetWeek's Transformation Survey understand the value of Web-based communication and collaboration with suppliers, but formal supply-chain projects over the Web are still in their early stages.

For example, companies conducting business-to-business e-commerce jumped from 32 percent of respondents last year to a whopping 76 percent today. Yet, when asked about specific Web-based applications running within their companies today, users most frequently spoke of customer support, marketing or sales, with inventory management coming in at just 37 percent. Supply-chain management ranked dead last at just 30 percent.

Clearly, the industry is in the very earliest days of the supply-chain revolution. Challenges for companies aiming to aid velocity to their supply chains include: old or broken legacy systems and ERP implementations, business processes unprepared to move at Internet speed and a lack of incentive for suppliers to overturn their own business processes to get on with the program.

Even in the face of these very serious challenges, it's hard to deny the power of more information-rich supply chains driven by ubiquitous Internet connections. "The basic value the Internet brings is scalable communications," says John Fontanella, an AMR Research analyst. "Today, at best, you might have 20 percent of your business partners in a trading community electronically connected. What the Internet promises is connection rates of 90 percent to 95 percent."

E-commerce leader Cisco Systems used both a carrot (the chance to participate in its phenomenal Web-based success) as well as a stick (participate or get dropped) to move its suppliers onto its

## Web-driven supply chain.

"It didn't hurt that we said, 'You've got two years to make the transition or you'll no longer be our supplier,' " says Cisco CEO John Chambers. "We provided both the carrot and the stick, and I think many companies are in the position to nudge the supplier base that way. I also think many suppliers are beginning to realize that if they don't change, many of their leading-edge customers will ultimately require them to change, or they'll get left behind."

But Web-based supply chains aren't only about reach. They are about better data, and the chance to use that data to bring new velocity to a company's business practices. "What it allows is rapid, real-time communication and a common view of data across suppliers, manufacturers and customers. That lets you take inventory in the supply chain and allocate it and reallocate it to real sources of demand versus forecasts of demand," says analyst Fontanella.

## Quite A Process

Supply-chain management is the process of optimizing a company's internal practices, and the company's interaction with suppliers and customers. It includes demand forecasting, materials sourcing and procurement, inventory and warehouse management, and distribution logistics. Companies that marshal their supply chains to perform these functions can deliver products quicker and at a lower cost or higher profit margin than their competitors. However, today's supply chains are too often focused inward, targeting the requirements of the players in the supply chain rather than the customers. The Internet makes that orientation even more dangerous, as customers expect instantaneous service, and customization and build-to-order processes find a universal and instantly accessible front-end in the Web.

Indeed, in this environment, it is the customer, not the plant manager, who ultimately keeps track of an order via self-service Web sites where he can find, configure, price and schedule delivery of products.

Consider Alliance Entertainment. The giant distributor of music, videos and games counts on the Web to connect more directly with its e-retailing customers, and, in the process, finds itself acting not only as a distributor but as a strategic partner. Alliance customers include Barnes and Noble, Artists Direct, The Ultimate Band List and Wherehouse Entertainment. The distributor is using the Internet to enhance its supply-chain relations in several ways.

The first is to extend traditional EDI transactional capabilities to smaller e-retailers. "EDI value-added networks can be very expensive," says Perry Patterson, director of operations and consumer direct fulfillment for Alliance. "We've provided tools so that some mom-and-pop shop over the Internet can place an order directly with us through a secure connection."

The Internet automates transactions for more retailers, and it also sets up Alliance as a key partner. "Overnight, we can drop the order into our system and commence the pick, pack and ship process," says Patterson. Alliance also provides a variety of value-added services for the retailer-including custom packing and labeling, dealing with inserts and gift wrapping, and online couponing and promotions. That kind of support gives e-retailers the freedom to outsource most of their fulfillment operations, yet still retain a personal touch with their customers.

Alliance also provides its retail customers with deep insight into its available inventories. That's crucial for providing Web-based customer service. "We can allow them, through secure mechanisms, to access our inventories in real time and present to the consumer up-to-the-moment information on what product is available for shipment," says Patterson. Alliance also has PC- and Web-based tools to make searching the

distributor's massive product database easier. Retail customers can find new products, and also download content like descriptions, artists' biographies and album art they can use to merchandise their Web sites.

Most of all, the Internet lets Alliance "get away from the batch mentality of EDI and related technologies to provide real-time access to information," says Patterson.

While Amazon.com is getting a lot of attention these days for building out its own distribution warehouses, Alliance says most of the e-retailers it works with keep their inventories virtual. "What we're seeing, actually, is tremendous pressure on us to perform. E-retailers recognize their core competency and seek out fulfillment companies that can perform the back-end processes for them. It puts more and more pressure on us as suppliers to be good at what we do."

### The Sears Chain

Web-based supply chains can bring new velocity to traditional retailing processes, as well. Retail giant Sears says leveraging the Web can cut cost and time out of how the company moves products into its stores. "In capsule, we've found the faster we can flow information, the faster we can flow product," says Pete Rector, vendor management director for Sears Roebuck & Co.

For years, Sears has been working with its vendors to bring up compliance on advanced ship notices, or ASNs, an EDI message set that lets the retailer know where the products it's expecting are in the supply chain.

"We've been at it for 10 years, but only recently did we impose a set of standards-within the last two years-that virtually mandates that if you can't do an ASN yourself, the vendor has to use a third-party system," says Rector. And those third-party systems, from vendors including SPS Commerce and Quick Response Services (QRS), use Web interfaces to let vendors that can't afford or manage the complexity of EDI to move their product and ship data electronically. With those systems and requirements in place, Sears has been able to move ASN-compliance from the high 80 percent range to 99 percent, says Rector.

"In many small companies, the EDI staff is a secretary named Emma," says Rector, adding that forms-based Web interfaces-starting at about \$500 per month -give those small companies the same level of competency as mega-million dollar corporations.

Sears is also using the Web to solve another major supply-chain issue: the plague of bad data.

About 5 percent of all ASNs come across "sick or wounded," meaning they have some error that makes them unusable. To combat such problems, Sears set up an "ASN Hospital" extranet site, complete with "virtual gurneys," or filters, to bring ailing ASNs into the system. There, the ASNs are analyzed and fixed, and the vendor that sent the sick ASN is informed via e-mail so they don't make the same mistake again. Sears also built an extranet site, dubbed the Sears Business Exchange, to let key suppliers see sales and supply data on their products down to the store level. That lets all parties in the supply chain improve planning.

"What that implies is that the vendor can use that information and start to manage its production, raw material needs," Rector says.

With early Web-based supply chain efforts paying off, Sears is working on two more advanced projects. One, which Rector calls total supply-chain visibility, will help Sears determine precisely where items are in shipment-for example, "the truck-driver just stopped to get a hot-dog in Cleveland," Rector quips-to

bring even greater efficiency to the supply chain.

A second project, called dynamic building and routing, takes advantage of product shipping information to better manage transportation costs. If Sears and its vendors can better communicate the cubic size and weights of shipments, they can fill their trucks more and move products more efficiently, Rector says. "When you're running \$800 million in transportation expense annually, a decrease of 10 percent to 15 percent is a huge savings," he says.

Web-based supply chains also benefit manufacturers ultimately feeding retail channels. Timberland, which makes footwear, apparel and outdoor gear, is rolling out a new Web-based supply-chain collaboration tool from Manugistics to work more closely with retailers to help them get the products they need, says Yusef Akyuz, Timberland's vice president of information services.

Timberland and its retail partners will use the platform to develop business forecasts and plans in a more collaborative manner, replacing old methods, including voice communications, faxes, e-mails and shared spreadsheets.

"Basically, we'd throw over the wall a forecast and a business plan, and our retail partners would look at it, adjust it and tweak it, and throw it back over again. It added significant time to develop a plan that everybody bought into," Akyuz says. Now, with a Web-based collaborative environment, all the parties can more easily share data, see forecasts and quickly implement changes.

Timberland is early in the process, and will roll the new Web-based system in phases, starting with its own sales force, then adding headquarter's business analysts, then a large retailer or two, and finally its entire retail base. Eventually, the collaboration data will begin to flow to the back end of the Timberland supply chain, helping it make decisions about the materials that go into its products.

### Leading the Way

Not surprisingly, Web-based supply chains are probably most advanced in PC and other high-tech manufacturing processes. Dell might get all the attention, but the technology industry is packed with vendors and suppliers using the Web to wrench every efficiency out of their supply chains.

One of the most advanced supply chains may belong to Marshall Industries, which is using the Web as a neutral middle platform to tie together disparate ERP systems across its supply chain.

"We can take any of the participants in our supply chain, bring them behind our firewall, take them and connect them into our data warehouse, cleanse data from disparate platforms, and run the data against an inference engine we've built that includes forecast, product-change and collaboration tools," says Marshall CEO Rodin. By using the Web and making this mediation layer (dubbed MACRO) something that sits outside traditional enterprise apps, Marshall can keep its supply chain agile and up to date with the latest technologies.

Elsewhere, telecom vendor Pairgain Technologies is using the Web to build what it calls a "super team" of suppliers to speed time to market and better manage just-in-time product changes, says Gary Lenik, Pairgain's director of materials.

Pairgain undertook its major supply-chain re-engineering back in 1995. By improving logistics and building a better schedule for contract manufacturers, Pairgain was able to cut cycle times by a factor of 10, reducing suppliers from 250 to 12. The whole process "wasn't so much Web- as EDI-based," says



- Lenik, but it was the rigidity of EDI that kept it from reaching its full potential.

When a customer wanted a change in a Pairgain product, a flurry of faxes and e-mails ran up and down the Pairgain supply chain as customers described what they wanted and Pairgain went to its suppliers to see if it could acquire or tweak the components necessary to make the changes.

By building what he calls a "virtual change control board"-basically a Web-based, collaborative extranet site-Pairgain was able to bring all the parties together online and boil down the process to a matter of days in some instances, instead of months, Lenik says. Which is what supply-chain management is all about.

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